

Utilization of innovative educational applications for developing the spiritual and creative potential of future educators

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ABSTRACT

Contemporary training of future educators necessitates the development of not only professional but also spiritual and creative qualities. This study aims to evaluate the effectiveness of an online course utilizing a chatbot to enhance the spiritual and creative potential of students in pedagogical disciplines. The research involved 534 of 4th year students from two universities in Kazakhstan, divided into an experimental group (n=268) and a control group (n=266). The experimental group completed six modules covering creative thinking, spiritual development, public speaking, and other aspects of self-development. Pre- and post-course surveys assessed five indicators of spiritual health: vitality, resilience, values, meaning, and openness to change. The intervention resulted in a significant improvement in three key indicators: resilience, values, and meaning. These enhancements are likely to contribute to better preparation of future educators by strengthening their resilience to professional challenges, helping them understand their values and goals, and enhancing their awareness of the significance of education for society.

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1. INTRODUCTION

Contemporary pedagogical practices are increasingly focused on preparing competent professionals capable not only of effectively imparting knowledge but also of inspiring and fostering creative thinking and emotional intelligence among students [1], [2]. In this context, the development and implementation of educational applications acquire particular significance, posing new challenges for educators and researchers and unveiling previously inaccessible opportunities [3], [4]. Previous researchers [5] have documented that spirituality mediates the relationship between context (race, socio-economic indicators, and infrastructural resources) and psychological well-being. This implies that the level of spirituality can influence how individuals experience and adapt to their lives, even in the presence of various social, economic, and infrastructural constraints. This is an important finding for educators for several reasons.

Firstly, educators must take into account various aspects of the context in which their students are learning, including racial background, socioeconomic status, and access to infrastructural resources [5]. Secondly, educators play a crucial role in the development of students' spirituality by assisting them in cultivating their values, beliefs, and sense of purpose in life. Thirdly, understanding how various factors influence psychological well-being through spirituality [5] will help educators create a more inclusive and supportive environment for all students, regardless of their context. It has also been reported that there is

a close relationship between the psychological resilience of university students and their level of spiritual well-being [6]. In a study by Daniyarova *et al.* [7], psychogenic factors hindering the development of the cognitive and emotional components of future educators' spiritual health have been identified.

Despite the significance of spiritual well-being for educators, previous studies [8], [9] indicate that this topic remains underexplored. In particular, student educators lack a systematic approach to the development of their spiritual potential, highlighting the need for innovative methods in this area. Moreover, 90% of teacher candidates from the study by Yeschenkulova *et al.* [9] noted a lack of attention to the development of spiritual and creative potential within the school-university system and stated that there should be lectures on the development of spiritual and creative potential.

Several researchers [10], [11] in the fields of education and psychology have highlighted the influence of artificial intelligence (AI) on personality development and creative potential. However, the application of AI applications for the targeted development of spiritual potential through creativity remains a practically unexplored aspect. Thus, the issue lies in the insufficient attention given to the spiritual and creative development of future educators within university and school educational systems.

The focus of this research is to explore the opportunities and effectiveness of using innovative educational applications, including chatbots, for developing the spiritual and creative potential of future educators within the university-school system. The proposed solution involves the development of an online course integrated with a chatbot, aimed at fostering key aspects of spiritual well-being, including vitality, resilience, values, meaning, and openness to change. In contrast to prior studies, this work evaluates the effectiveness of applying chatbot-based educational technologies specifically for fostering spiritual health, a critical yet underexplored component in teacher education. The novelty of the study lies in the implementation of an interactive approach utilizing AI technologies for the targeted development of educators' spiritual potential. This approach enhances the effectiveness of learning while making it more inclusive and technologically adapted to contemporary realities.

Research shows that the development of spirituality can contribute to an increase in resilience and the ability to cope with difficulties [12], [13]. From this, it follows that participation in interventions aimed at developing spiritual and creative potential through online courses and chatbots can help participants better cope with adversities and stressful situations. Awareness of one's own values and goals is a key aspect of personal development and well-being [14]. Participation in an intervention aimed at developing spiritual and creative potential may contribute to a deeper understanding of these aspects of personality. Research indicates that awareness of one's life path and the significance of one's actions is associated with a sense of life purpose and psychological well-being [15]–[17]. The development of spirituality may contribute to this process, and the use of online courses and chatbots may be one way to achieve this goal.

Therefore, this study poses research questions based on the hypothesis that the development of spiritual and creative potential through an online course and the use of chatbots will be effective in enhancing the spiritual health of future educators. The research questions (RQ1-RQ5) are aimed at examining various aspects of this hypothesis, including the ability to approach life with greater enthusiasm (RQ1), cope with adversities and stressful situations (RQ2), understand one's life values and goals (RQ3), find meaning and true directions (RQ4), and be more motivated and ready for change (RQ5). Each of these questions is important for understanding the impact of the proposed intervention on the spiritual health and potential of future educators.

2. METHOD

2.1. Participants

Students enrolled in the 4th year of the Pedagogy and Psychology Program at two universities in Shymkent, Kazakhstan, M. Auezov South Kazakhstan University and Miras University, were invited to participate in the intervention. Initially, 484 individuals expressed their willingness to participate. Inclusion criteria were as: enrollment in the pedagogy and psychology program at the participating universities, consent to participate. Exclusion criteria included failure to complete the questionnaire, failure to complete at least one homework assignment for the course, and attendance of less than 75% of Zoom classes. Throughout the study, 216 individuals were excluded, as shown in Figure 1. The final intervention sample (group A) consisted of 268 students, including 67 males and 201 females. The mean age of males in group A was 22.8 years (minimum 20 and maximum 34 years), and for females, it was 21.5 years (minimum 20 and maximum 26 years). Group B (control group) (n=266) was formed from students who did not participate in the intervention but were enrolled in the same pedagogy and psychology program (excluding the improving spiritual and creative potential course). The mean age of males in the control group was 22.2 years (minimum 21 and maximum 28 years), and for females, it was 21.8 years (minimum 20 and maximum 27 years).

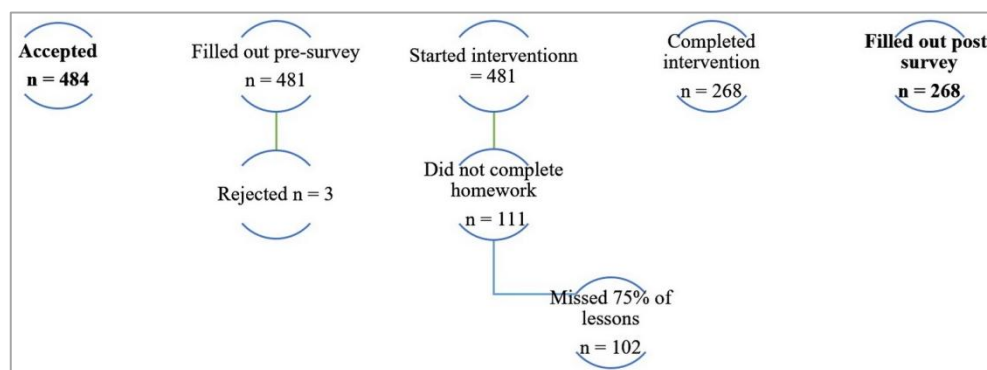


Figure 1. The flow of participants in group A through the intervention

2.2. Procedure

Students learned about the research at their respective universities. Those willing to participate underwent registration, signed a written agreement to participate, and gained access to the online course on improving spiritual and creative potential. Students in group A were briefed on the course content prior to the start of the study and were provided with all necessary information regarding its conduct. Before and after the intervention, students underwent the spiritual wellness assessment.

2.3. Intervention

The chatbot was tasked with functions such as sending notifications reminding participants of assignment deadlines, conducting surveys, monitoring attendance, collecting and processing feedback from students, and sending personalized notifications. Participants could ask the chatbot questions about the module content, assignments, terms, and receive answers. The chatbot provided tasks and exercises related to each module of the course. Additionally, the chatbot was equipped with functions to reward participants for learning progress using motivating stickers, such as “you did a great job today”, “keep it up!”, “good job”. Participants could also reach out to the chatbot in case of issues with course access, and technical questions.

The course comprised six modules: i) creative thinking and education; ii) ethics and spiritual development; iii) oratory art; iv) defining life goals and orientations; v) creative approaches to teaching; and vi) healthy lifestyle. The structure of the course is presented in Figure 2. Participants were granted access to the modules according to a schedule. Researchers selected modules related to spirituality, ethics, and creativity in pedagogy and coordinated them with two experts in the field of education. Some doubts arose among the authors regarding the module dedicated to oratory art. However, after consultations with experts, the researchers concluded that including oratory art in virtual events could significantly enrich participants' experience and contribute to their professional and personal growth as educators, for whom voice is one of the primary tools for identifying spiritual and creative potential. One theme corresponded to one educational module. Each educational module spanned five working days. Students studied the module materials and completed homework assignments. They practiced oratory techniques, developed creative teaching approaches, and reflected on ethical issues in education.

For each module, researchers selected at least one homework assignment. One instructional module was designed for five working days. For example, the topic was oratory. On Monday, participants received an invitation to a live broadcast featuring a renowned speaker on the art of oratory. For 45 minutes, the speaker presented key information on the fundamentals of oratory, expressiveness, intonation, and techniques of speech delivery. Participants could ask questions and comment during the broadcast. After the broadcast, they were assigned homework to read two quatrains from any work with different intonations. The homework was assessed by an expert. On the following day, another speaker conducted a video conference to instruct participants on diction and articulation. The session lasted 1 hour and 45 minutes. Participants received a summary with exercises for developing diction and articulation. On the third day, participants received a video lesson on improvisation. The homework assignment was to choose any monologue from a favorite movie or TV series, approximately one minute in length, reproduce it in the same manner as the actor from the series, and then switch to a diametrically opposite character and try to convey the same words. The homework was assessed by an expert. The 4th working day of the block was dedicated to constructing speeches and presentations in the educational process. After the video lesson, participants had to select a topic of interest and properly structure their presentation. Participants had 24 hours to complete each of the four homework assignments. Each homework assignment was shared in a group chat by the participants. Other participants could react to and comment on their colleagues' work.

After completing the assignments, students received feedback from researchers or experts, who evaluated their work and provided recommendations for improvement. If researchers and experts pointed out errors, students had to correct them to gain access to the next module. In the fifth and final lesson, module speakers conducted a joint live broadcast, commenting on the main mistakes of the participants, answering questions, and providing practical recommendations. At the conclusion of the course, students underwent final testing and reflection, where they were able to assess their progress, identify key lessons learned, and contemplate further steps in their professional development. Such an approach to intervention implementation allowed teacher-students to effectively acquire knowledge and skills related to spirituality, ethics, and creativity in pedagogy, aimed at making them more competent and successful in their profession.

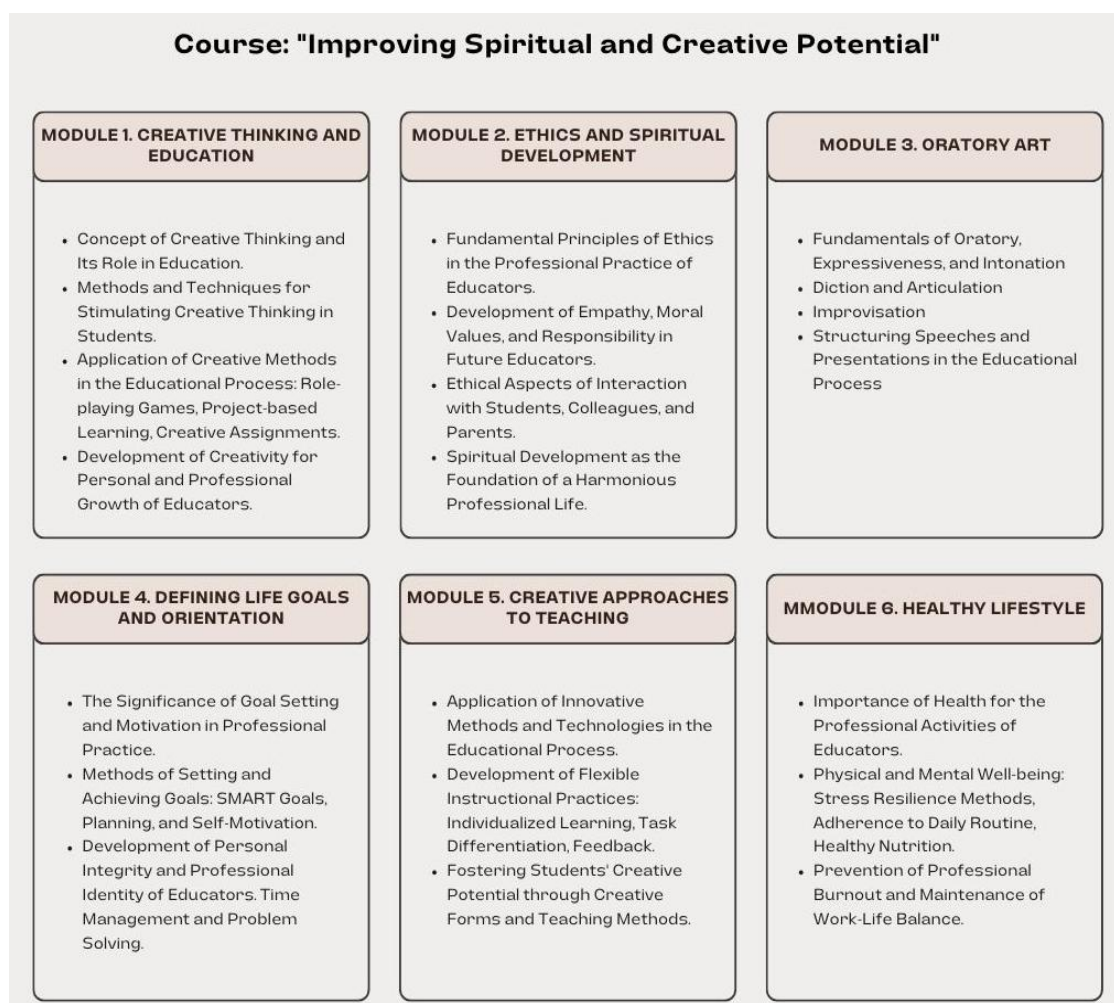


Figure 2. The course structure

2.4. Scale

The spiritual wellness assessment scale was utilized, comprising five indicators: vitality, resilience, values, meaning, and openness to change. Each indicator is designed to measure a specific aspect of spiritual well-being, providing a comprehensive assessment of participants' overall spiritual health. The definitions of these indicators, examples of questions for each category, and Cronbach's alpha coefficient for this study are presented in Table 1, ensuring the clarity and reliability of the measurement instrument employed. Each category comprised three items, totaling 15 items overall. Each item was to be rated on a scale from 1 to 5, where 1=rarely, 2=sometimes, 3=true, approximately half the time, 4=often, and 5=always or nearly always. Each respondent was required to select the response that most closely aligned with their personal experience.

Table 1. Structure and reliability of spiritual wellness assessment

Assessment parameter	What it means	Example question	Cronbach's alpha
Vitality	Desire for life and enthusiasm. High scores indicate vitality, energy, and optimism. Low scores may indicate feelings of boredom, apathy, or stagnation in life.	I find myself in a rut	0.85
Resilience	Ability to cope with hardships and difficulties. High scores indicate confidence in one's abilities and the ability to overcome challenges. Low scores may indicate doubts about one's ability to cope with life's challenges.	I face situations I doubt I can handle	0.79
Values	Clarity in life values and decision-making ability. High scores indicate clarity in values and confidence in life choices. Low scores may indicate uncertainty in life values and choices.	I live by my convictions	0.81
Meaning	Ability to find meaning in life. High scores indicate a sense of purpose and direction in life. Low scores may indicate feelings of being lost and a lack of meaning in your life.	I explore the why of life	0.83
Openness to change	Motivation for change and confidence in achieving it. High scores indicate readiness for change. Low scores may indicate fear of change and difficulties in realizing it.	I lack the motivation I need to change	0.77

2.5. Statistical data analysis

The data were tested for normality of distribution using a graphical method (histograms), which confirmed that the data were normally distributed for parametric tests. Intergroup comparisons were conducted using an independent t-test, while intragroup comparisons were performed using a paired t-test. All statistical analyses were carried out using SPSS software (version 27). The significance level for all tests was set at $p < 0.05$. Effect sizes were evaluated using cognitive effect coefficients, specifically Cohen's d , to determine the practical significance of the results.

3. RESULTS AND DISCUSSION

The results of the pre-testing did not reveal significant differences between the intervention group (group A) and the control group (group B) across all assessment indicators, as seen in Table 2. For instance, in terms of vitality: group A (2.77 ± 0.76), group B (2.81 ± 0.88), $p = 0.216$, $d = 0.049$; in terms of resilience: group A (2.61 ± 0.75), group B (2.54 ± 0.75), $p = 0.324$, $d = -0.093$; in terms of values: group A (2.89 ± 0.83), group B (2.65 ± 0.69), $p = 0.088$, $d = -0.309$; in terms of meaning: group A (2.97 ± 0.71), group B (3.04 ± 0.72), $p = 0.331$, $d = 0.099$; in terms of openness to change: group A (3.05 ± 0.73), group B (3.11 ± 0.76), $p = 0.297$, $d = 0.081$. Based on the post-test results, participants in group A (intervention group) demonstrate a higher level of resilience, clearer values, and a greater sense of life meaning compared to participants in group B (control group). Vitality and openness to change remained approximately at the same level in both groups, as presented in Table 3.

Table 2. Descriptive statistics and t-statistics between groups A and B on assessment indicators (pre-test)

Variables	Group A		Group B		t	p	d	95% CI lower upper
	M	SD	M	SD				
Vitality	2.77	0.76	2.81	0.88	1.11	0.216	0.049	-0.121 - 0.218
Resilience	2.61	0.75	2.54	0.75	0.95	0.324	-0.093	-0.263 - 0.076
Values	2.89	0.83	2.65	0.69	1.54	0.088	-0.309	-0.479 - -0.139
Meaning	2.97	0.71	3.04	0.72	0.92	0.331	0.099	-0.071 - 0.268
Openness to change	3.05	0.73	3.11	0.76	0.9	0.297	0.081	-0.089 - 0.25

Table 3. Descriptive statistics and t-statistics between groups A and B on outcome measures (post-test)

Variables	Group A		Group B		t	p	d	95% CI lower upper
	M	SD	M	SD				
Vitality	2.96	0.64	2.88	0.76	0.94	0.079	-0.114	-0.283 - 0.056
Resilience	3.11	0.71	2.63	0.79	5.66	0.001	-0.639	-0.813 - -0.466
Values	3.26	0.77	2.71	0.65	6.88	0.001	-0.772	-0.947 - -0.596
Meaning	3.32	0.75	2.89	0.64	5.42	0.001	-0.607	-0.781 - -0.434
Openness to change	3.25	0.64	3.31	0.70	1.03	0.105	0.089	-0.08 - 0.259

For the vitality, statistical analysis did not reveal a significant difference between the groups ($p = 0.079$, $d = -0.114$). Group A: 2.96 ± 0.64 , group B: 2.88 ± 0.76 . Thus, the results for this measure remained comparable. Resilience: statistical analysis showed a significant difference between the groups ($t = 5.66$, $p = 0.001$, $d = -0.639$). Group A: 3.11 ± 0.71 , group B: 2.63 ± 0.79 . Participants in group A demonstrated a higher

level of resilience compared to group B. In the values, statistical analysis also revealed a significant difference between the groups ($t=6.88$, $p=0.001$, $d=-0.772$). Group A: 3.26 ± 0.77 , group B: 2.71 ± 0.65 . Participants in group A exhibited clearer values compared to group B. As for meaning, statistical analysis also showed a significant difference between the groups ($t=5.42$, $p=0.001$, $d=-0.607$). Group A: 3.32 ± 0.75 , group B: 2.89 ± 0.64 . Participants in group A felt a greater sense of meaning in life compared to group B. in the openness to change, statistical analysis did not reveal a significant difference between the groups ($t=1.03$, $p=0.105$, $d=0.089$). Group A: 3.25 ± 0.64 , group B: 3.31 ± 0.70 . Thus, openness to change remained comparable between the groups. Following the post-test assessment, participants in group A exhibited higher levels of resilience, clearer values, and a greater sense of life meaning compared to those in group B. Openness to change remained approximately at the same level in both groups.

Upon comparing the pre-and post-test results of group A, as shown in Table 4, participants demonstrated improvement across all measures following the intervention. A firm effect size was observed for values ($d=1.337$), indicating a substantial shift in this area. A strong effect was seen for resilience ($d=0.75$), suggesting a meaningful increase in participants' ability to bounce back from adversity. A moderate effect was found for meaning ($d=0.479$), showing a notable enhancement in participants' sense of purpose. Additionally, a weak but statistically significant effect ($p<0.05$) was noted for vitality ($d=0.27$) and openness to change ($d=0.291$), indicating that even small but meaningful changes occurred in these areas as a result of the intervention.

Table 4. Descriptive statistics and T-statistics between pre-test and post-test of group A on assessment measures

Variables	Pre-test		Post-test		t	p	d
	M	SD	M	SD			
Vitality	2.77	0.76	2.96	0.64	2.51	0.036	0.27
Resilience	2.61	0.75	3.11	0.71	5.79	0.001	0.75
Values	2.89	0.83	3.26	0.77	7.26	0.00	1.337
Meaning	2.97	0.71	3.32	0.75	3.13	0.01	0.479
Openness to change	3.05	0.73	3.25	0.64	2.78	0.025	0.291

The comparison of pre-test and post-test results of group B are presented in Table 5. Participants in group B did not show statistically significant improvement in the post-test for the parameters vitality ($d=0.097$), resilience ($d=0.117$), and values ($d=0.09$). A weak but significant effect was observed for meaning ($d=-0.219$) and openness to change ($d=0.274$) ($p<0.05$). Interestingly, while openness to change increased, a decrease was observed in meaning.

Table 5. Descriptive statistics and T-statistics between pre-test and post-test of group B on assessment parameters

Variables	Pre-test		Post-test		t	p	d
	M	SD	M	SD			
Vitality	2.81	0.88	2.88	0.76	0.88	0.516	0.097
Resilience	2.54	0.75	2.63	0.79	1.24	0.089	0.117
Values	2.65	0.69	2.71	0.65	0.91	0.597	0.09
Meaning	3.04	0.72	2.89	0.64	2.62	0.005	-0.219
Openness to change	3.11	0.76	3.31	0.7	3.14	0.001	0.274

The obtained results indicate the significance of the intervention program in improving spiritual and creative potential. However, the program did not have a significant impact on the levels of vitality and openness to change (RQ1). This result may be related to the fact that the intervention was conducted entirely online, which likely limited personal contact and interaction with nature, an element shown in study by Nisbet *et al.* [18] to restore energy and improve mood. Future considerations might include a blended approach that combines online elements with interactions with nature to enhance the program's effect on these aspects of spiritual well-being.

A notable outcome is that participants in the intervention group exhibited a higher level of resilience to stress (RQ2). This finding is consistent with previous research emphasizing the role of spiritual growth and psychological well-being in developing resilience [19]. Holt-Quick *et al.* [20] have also reported on the ability to gain resilience through chatbots that utilize principles from cognitive-behavioral therapy and positive psychology. In this study, the chatbot was also tailored to principles of positive psychology [21], indicating participants' achievements and providing encouragement.

The greater clarity of values among intervention group participants indicates that the program helped them better understand their own life values and goals (RQ3). The data align with the self-determination theory [14], which underscores the importance of understanding one's goals for personal growth and well-being. The findings confirm that spiritual and creative potential can influence the awareness of life goals.

The increase in meaning among intervention group participants suggests an awareness of the life path and the significance of their actions (RQ4). The literature Wilkinson *et al.* [22] indicates a connection between spiritual development and the awareness of life's meaning, which is consistent with the results observed in the intervention group. Previous research by Hsu *et al.* [23] has already discussed the ability of chatbots to influence decision-making by students and facilitate life choices.

The statistical analysis did not reveal a significant difference between the groups regarding openness to change (RQ5). Both groups demonstrated a modest but statistically significant improvement in this indicator. These results may be associated with the notion that the development of creative potential and spiritual awareness fosters greater openness to new opportunities and changes [16], [17]. However, it is worth noting that the improvements were relatively small, suggesting that the program may not have had a substantial impact on this aspect. Control group participants, who did not engage in the intervention but otherwise followed the same academic program, did not demonstrate significant improvements in spiritual health. Interestingly, it was noted that an increase in the openness to change indicator was associated with a decline in the meaning indicator. This may be due to participants beginning to consider their lives and goals in a more open and flexible manner, temporarily leading to a loss of stability in their perception of life's meaning. Perhaps other academic approaches utilized within the educational programs helped enhance Meaning. Additional research is needed to gain a more precise understanding of this dynamic and to determine the true causes of this phenomenon.

Thus, the intervention aimed at developing spiritual potential through a chatbot demonstrated a significant impact on enhancing stress resilience (resilience), confirming the feasibility of using such technologies to support participants' psychological well-being. The results also highlight the importance of the program in helping participants gain a deeper awareness of their life values (values). This finding has considerable practical implications, as clarity in defining personal values and goals is critical for personal development and decision-making [24]–[26].

Given the significance of this factor, integrating such programs into the educational process could assist students in understanding and structuring their life orientations. Furthermore, in the face of contemporary challenges such as stress and feelings of helplessness [27], [28], the ability to find meaning in life (meaning) becomes a crucial factor in mental well-being. The substantial increase in meaning underscores the potential of chatbots as tools for providing support in self-exploration and self-awareness.

It is important to create suitable conditions for its expression, allocating time and space for this purpose. The development of spiritual and creative potential implies the awareness that each individual possesses a unique level of creativity [29], [30], the realization of which requires spiritual health among other factors [31]. Revealing one's inner world to students is natural for a teacher [32], and the richer, healthier, and fuller it is, the more fruitful it can be. Thus, reinterpreting the foundations of creativity in terms of developing spiritual and creative potential helps emphasize the importance of harmony between the inner world and the expression of creativity.

3.1. Main recommendations

Based on the conducted research, recommendations are presented for the development of an online course using a chatbot to enhance the spiritual and creative potential of future educators. Firstly, attention should be paid to integrating stress and difficulty management techniques, such as breathing practices and relaxation methods, to enhance spiritual and creative potential. In this study, module 6 included stress resilience methods, which could be expanded with more emphasis on psychological support.

Secondly, to foster mindfulness and self-understanding, participants can be offered tasks and exercises aimed at developing mindfulness and understanding of their values and goals. For instance, through self-analysis and self-development tasks facilitated by the chatbot. In this study, the chatbot provided support and motivation during self-development sessions by sending reminders, encouragement, and positive messages. Additionally, the chatbot distributed various tasks and exercises for the development of specific skills (time management, communication, problem-solving, and decision-making).

In the future, the chatbot could include self-assessment tools, such as assessing strengths and weaknesses, values, interests, and individual action plan development for goal achievement. Moreover, it would be beneficial for the chatbot to have functionality to assist in analyzing personal progress, and asking questions about achieved results, experiences, and past difficulties, which the authors of this study were unable to technically implement. For a more comprehensive understanding of the intervention program's impact on the spiritual and creative potential of future educators, as well as for determining optimal teaching

strategies and methods, further research and program adaptation based on the obtained results and participants' feedback is recommended.

3.2. Limitation

The study sample consisted of 4th-year students majoring in pedagogy and psychology program from two universities in the Republic of Kazakhstan, which may limit the generalizability of the results to a broader population. Despite their internal reliability, the scales used to measure spiritual health may have been insufficiently sensitive or may not have covered all aspects of the constructs under investigation. The duration of the online course, spanning six weeks, and the use of a chatbot may have been inadequate to achieve significant changes in all aspects of spiritual and creative potential. The study may not have accounted for the influence of other factors that could affect participants' spiritual and creative potential, such as personal events or external stressors, which could impact the interpretation of the results. Additionally, not all technical ideas of the authors were implemented through the chatbot, which could also have influenced the effectiveness of the intervention.

4. CONCLUSION

The hypothesis of the study, that the development of spiritual and creative potential through an online course and the use of a chatbot is effective for enhancing the spiritual health of future educators, was partially supported. The results of the study highlight the importance of integrating chatbots into educational programs for future educators. The use of technology may contribute to the enhancement of spiritual health, creativity, and resilience to stress, which is particularly crucial for educators facing high workloads and emotional challenges. The intervention program, comprising an online course with a chatbot, had a positive impact on resilience, and awareness of personal values and life meaning, but did not significantly affect vitality and openness to change. Thus, while the program demonstrates potential for improving certain aspects of future educators' spiritual health, its effectiveness may be limited in influencing other aspects. A highly promising direction is to examine the long-term effects of the intervention program to determine whether positive changes in spiritual and creative potential are sustained over time. Moreover, the approach used may extend beyond Kazakhstani teacher students and be adapted for various age groups, cultural contexts, and professional fields to determine how best to support the development of spiritual and creative potential in different situations. Further research could also compare different intervention methods, including the use of chatbots, online courses, and traditional teaching methods, to identify the most effective approaches to enhancing spiritual and creative potential.

The conclusions of this study hold value for educational institutions in the development and implementation of educational programs aimed at fostering the spiritual and creative potential of students, particularly future educators. This may help enhance the quality of education and prepare professionals for working with students. Educators and teachers can utilize these findings to improve their teaching methodology, thereby creating a more supportive and stimulating learning environment. For students, these conclusions can serve as a source of information regarding which methods and strategies may be effective in developing their spiritual and creative potential. They can use this knowledge for self-development and self-analysis in their future personal and professional endeavors. Such courses may be beneficial not only for educators but also for professionals in other fields who face high levels of stress and require continuous self-development (e.g., medical practitioners, social workers, and managers). Future research could focus on testing the program with broader and more diverse samples, including individuals from various age groups and educational systems, to gain a better understanding of the universality of the proposed approach.

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This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

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C : Conceptualization

M : Methodology

So : Software

Va : Validation

Fo : Formal analysis

I : Investigation

R : Resources

D : Data Curation

O : Writing - Original Draft

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Vi : Visualization

Su : Supervision

P : Project administration

Fu : Funding acquisition

CONFLICT OF INTEREST STATEMENT

Authors declare that they have no conflict of interest.

INFORMED CONSENT

We have obtained informed consent from all individuals included in this study.

ETHICAL APPROVAL

The research related to human use has been complied with all the relevant national regulations and institutional policies in accordance with the tenets of the Helsinki Declaration. The study obtained approval from the ethics committees of each participating university (Protocol No. JT 21166045 and OE 747141).

DATA AVAILABILITY

The authors confirm that the data supporting the findings of this study are available within the article.

REFERENCES

- [1] Y. Boari, R. Megavitry, P. J. Pattiasina, H. T. Ramdani, and H. Munandar, "The analysis of effectiveness of mobile learning media usage in train students' critical thinking skills," *MUDIR: Jurnal Manajemen Pendidikan*, vol. 5, no. 1, pp. 172–177, 2023.
- [2] M. Durnali, Ş. Orakci, and T. Khalili, "Fostering creative thinking skills to burst the effect of emotional intelligence on entrepreneurial skills," *Thinking Skills and Creativity*, vol. 47, p. 101200, 2023, doi: 10.1016/j.tsc.2022.101200.
- [3] K. Alhumaid, S. Al Naqbi, D. Elsoori, and M. Al Mansoori, "The adoption of artificial intelligence applications in education," *International Journal of Data and Network Science*, vol. 7, no. 1, pp. 457–466, 2023, doi: 10.5267/j.ijdns.2022.8.013.
- [4] M. Montenegro-Rueda, J. Fernández-Cerero, J. M. Fernández-Batanero, and E. López-Meneses, "Impact of the Implementation of ChatGPT in Education: A Systematic Review," *Computers*, vol. 12, no. 8, p. 153, 2023, doi: 10.3390/computers12080153.
- [5] M. P. Wissing, A. W. Fadji, L. Schutte, S. Chigeza, W. D. Schutte, and Q. M. Temane, "Motivations for Relationships as Sources of Meaning: Ghanaian and South African Experiences," *Frontiers in Psychology*, vol. 11, p. 2019, 2020, doi: 10.3389/fpsyg.2020.02019.
- [6] M. Borji, N. Memaryan, Z. Khorrami, E. Farshadnia, and M. Sadighpour, "Spiritual Health and Resilience Among University Students: the Mediating Role of Self-Esteem," *Pastoral Psychology*, vol. 69, no. 1, pp. 1–10, 2020, doi: 10.1007/s11089-019-00889-y.
- [7] A. B. P. Daniyarova, N. B. Zhiyenbaeva, and O. B. Tapalova, "Indicators of the Relationship Between Psychological Health and Personal Characteristics of University Students," in *Complex Social Systems in Dynamic Environments: Advanced Theories, Innovative Methods, and Interdisciplinary Research Results*, S. G. Maximova, Ed., Cham: Springer International Publishing, 2023, pp. 1199–1205, doi: 10.1007/978-3-031-23856-7_108.
- [8] A. Jaber, M. Momennasab, S. Yektatalab, A. Ebadi, and M. A. Cheraghi, "Spiritual Health: A Concept Analysis," *Journal of Religion and Health*, vol. 58, no. 5, pp. 1537–1560, Oct. 2019, doi: 10.1007/s10943-017-0379-z.
- [9] E. Yeshekulova, A. Usapbayeva, U. Abdigapbarova, A. Rysbayeva, G. Rysbayeva, and D. Gaukhar, "Development of the spiritual and creative potential of future teachers in the school-university system," *Cypriot Journal of Educational Sciences*, vol. 17, no. 4, pp. 1347–1358, 2022, doi: 10.18844/cjes.v17i4.7158.
- [10] F. Pedro, M. Subosa, A. Rivas, and P. Valverde, *Artificial intelligence in education: challenges and opportunities for sustainable development*, Paris: UNESCO, 2019. [Online]. Available: <https://unesdoc.unesco.org/ark:/48223/pf0000366994>.

- [11] S. Wang, Z. Sun, and Y. Chen, "Effects of higher education institutes' artificial intelligence capability on students' self-efficacy, creativity and learning performance," *Education and Information Technologies*, vol. 28, no. 5, pp. 4919–4939, 2023, doi: 10.1007/s10639-022-11338-4.
- [12] G. Shahina and A. Parveen, "Role of spirituality in building up resilience and mental health among adolescents," *Indian Journal of Positive Psychology Review*, vol. 2020, no. 4, pp. 392–397, 2020. [Online]. Available: <https://iahrw.org/our-services/journals/indian-journal-of-positive-psychology/>
- [13] L. Manning, M. Ferris, C. N. Rosario, M. Prues, and L. Bouchard, "Spiritual resilience: Understanding the protection and promotion of well-being in the later life," *Journal of Religion, Spirituality and Aging*, vol. 31, no. 2, pp. 168–186, 2019, doi: 10.1080/15528030.2018.1532859.
- [14] R. M. Ryan and E. L. Deci, "Self-Determination Theory," in *Encyclopedia of Quality of Life and Well-Being Research*, F. M. Maggino, Ed. Cham: Springer International Publishing, 2022, pp. 1–7, doi: 10.1007/978-3-319-69909-7_2630-2.
- [15] S. A. Hooker, K. S. Masters, K. M. Vagnini, and C. L. Rush, "Engaging in personally meaningful activities is associated with meaning salience and psychological well-being," *Journal of Positive Psychology*, vol. 15, no. 6, pp. 821–831, 2020, doi: 10.1080/17439760.2019.1651895.
- [16] A. Bandura, "Cultivate Self-Efficacy for Personal and Organizational Effectiveness," in *Principles of Organizational Behavior: The Handbook of Evidence-Based Management 3rd Edition*, E. Locke and C. Pearce, Eds., Hoboken: John Wiley & Sons, 2023, pp. 113–135, doi: 10.1002/9781394320769.ch6.
- [17] D. H. Schunk and M. K. DiBenedetto, "Self-efficacy and human motivation," in *Advances in motivation science*, J. Elliot, Ed., Amsterdam: Elsevier Academic Press, 2021, pp. 153–179, doi: 10.1016/bs.adms.2020.10.001.
- [18] E. K. Nisbet, J. M. Zelenski, and Z. Grandpierre, "Mindfulness in Nature Enhances Connectedness and Mood," *Ecopsychology*, vol. 11, no. 2, pp. 81–91, 2019, doi: 10.1089/eco.2018.0061.
- [19] E. Sagone and M. E. de Caroli, "Relationships between Psychological Well-being and Resilience in Middle and Late Adolescents," *Procedia - Social and Behavioral Sciences*, vol. 141, pp. 881–887, 2014, doi: 10.1016/j.sbspro.2014.05.154.
- [20] C. Holt-Quick *et al.*, "A chatbot architecture for promoting youth resilience," *Studies in Health Technology and Informatics*, vol. 276, pp. 99–105, 2021, doi: 10.3233/SHTI210017.
- [21] M. Csikszentmihalyi, "Positive psychology and a positive worldview: New hope for the future of humankind," in *Positive Psychological Science*, S. I. Donaldson, M. Csikszentmihalyi, and J. Nakamura, Eds., New York: Routledge, 2020, pp. 256–265.
- [22] D. Wilkinson *et al.*, "Why or Why Not? The Effect of Justification Styles on Chatbot Recommendations," *ACM Transactions on Information Systems*, vol. 39, no. 4, pp. 1–21, 2021, doi: 10.1145/3441715.
- [23] T. C. Hsu, H. L. Huang, G. J. Hwang, and M. S. Chen, "Effects of Incorporating an Expert Decision-making Mechanism into Chatbots on Students' Achievement, Enjoyment, and Anxiety," *Educational Technology and Society*, vol. 26, no. 1, pp. 218–231, 2023, doi: 10.30191/ETS.202301_26(1).0016.
- [24] N. Fürstenberg, K. Alfes, and E. Kearney, "How and when paradoxical leadership benefits work engagement: The role of goal clarity and work autonomy," *Journal of Occupational and Organizational Psychology*, vol. 94, no. 3, pp. 672–705, 2021, doi: 10.1111/joop.12344.
- [25] E. G. Helzer, T. R. Cohen, and Y. Kim, "The Character Lens: A Person-Centered Perspective on Moral Recognition and Ethical Decision-Making," *Journal of Business Ethics*, vol. 182, no. 2, pp. 483–500, 2023, doi: 10.1007/s10551-021-05010-z.
- [26] P. L. Eriksson, M. Wängqvist, J. Carlsson, and A. Frisén, "Identity development in early adulthood," *Developmental Psychology*, vol. 56, no. 10, pp. 1968–1983, Oct. 2020, doi: 10.1037/dev0001093.
- [27] H. Choi and H. J. Shin, "Entrapment, Hopelessness, and Cognitive Control: A Moderated Mediation Model of Depression," *Healthcare*, vol. 11, no. 8, p. 1065, 2023, doi: 10.3390/healthcare11081065.
- [28] H. Wepf, S. Joseph, and A. Leu, "Pathways to Mental Well-Being in Young Carers: The Role of Benefit Finding, Coping, Helplessness, and Caring Tasks," *Journal of Youth and Adolescence*, vol. 50, no. 9, pp. 1911–1924, 2021, doi: 10.1007/s10964-021-01478-0.
- [29] O. Budnyk, P. Mazur, L. Matsuk, L. Berezovska, and O. Vovk, "Development of professional creativity of future teachers (Based on comparative research in Ukraine and Poland)," *Revista Amazonia Investiga*, vol. 10, no. 44, pp. 9–17, 2021, doi: 10.34069/ai/2021.44.08.1.
- [30] V. Richard, D. Holder, and J. Cairney, "Creativity in Motion: Examining the Creative Potential System and Enriched Movement Activities as a Way to Ignite It," *Frontiers in Psychology*, vol. 12, p. 690710, 2021, doi: 10.3389/fpsyg.2021.690710.
- [31] A. A. Khaddam, A. Alzghoul, K. Khawaldeh, S. M. A. Alnajdawi, and O. Al-Kasasbeh, "How Spiritual Leadership Influences Creative Behaviors: the Mediating Role of Workplace Climate," *International Journal of Professional Business Review*, vol. 8, no. 2, p. 7, 2023, doi: 10.26668/businessreview/2023.v8i2.1106.
- [32] M. Hen and A. Sharabi-Nov, "Teaching the teachers: emotional intelligence training for teachers," *Teaching Education*, vol. 25, no. 4, pp. 375–390, 2014, doi: 10.1080/10476210.2014.908838.

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